Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	
Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems	ET Docket No. 00-258
Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use By The Mobile-Satellite Service	ET Docket No. 95-18
The Establishment of Polices and Service Rules for The Mobile-Satellite Service in the 2 GHz Band	IB Docket No. 99-81
Petition for Rule Making of the Wireless Information Networks Forum Concerning the Unlicensed Personal Communications Service	RM-9498
Petition for Rule Making of UTStarcom, Inc. Concerning the Unlicensed Personal Communications Service	RM-10024

COMMENTS OF WIRELESS INFORMATION NETWORKS FORUM, INC.

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SUMMARY

The Wireless Information Networks Forum, Inc. ("WINForum") submits the following comments in response to the Commission's Further Notice of Proposed Rule Making ("FNPRM") regarding potential reallocation of the UPCS band for either advanced wireless ("3G") services or relocation of incumbents that are displaced in support of 3G. As discussed herein, the FCC emphatically should not reallocate the UPCS frequencies for 3G or other relocated services. The UPCS bands are critically important to the communications needs of domestic users. Hundreds of thousands of users already rely on UPCS devices for a wide variety of important communications services. In addition, manufacturers are prepared to offer new, highly efficient products to an expanded base of users through the deployment of nomadic devices and, if the WINForum Petition is acted upon, through the use of the entire 20 MHz UPCS band. Reallocation of the UPCS frequencies would cause widespread dislocation and thwart the legitimate expectations of UPCS manufacturers, distributors and end users. This could eliminate manufacturers' willingness to invest in reliance on FCC policies, and would substantially undermine those manufacturers' relationships with current and potential customers.

Further, the 1910-1930 MHz frequency band is inappropriate for 3G or relocation use in any event. Use of UPCS band for 3G mobile services does not accord with international consensus on 3G spectrum allocations, given our present licensed PCS allocation structure. In addition, the existing use of the 1910-1920 MHz and 1920-1930 MHz bands for UPCS provides a necessary guard band that enhances the ability of licensed PCS operators to maximize efficient use of adjacent allocations. Given the very significant potential for interference to licensed operators, the Commission should be wary of any proposal to reallocate existing low power UPCS systems for 3G mobile services or relocation use.

Instead of reallocating the UPCS spectrum, WINForum urges the Commission instead to act affirmatively on WINForum's petition and make the 1910-1920 MHz band available for isochronous devices. In particular, the FCC should separate out the UPCS band issues, allowing them to be addressed more quickly and minimizing marketplace uncertainty. The FCC should take decisive action to provide the flexibility needed for isochronous devices to provide new services, expand their user base, and offer needed communications solutions to the U.S. public.

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COMMENTS OF WIRELESS INFORMATION NETWORKS FORUM, INC.

The Wireless Information Networks Forum, Inc. ("WINForum") respectfully submits its comments in response to the Federal Communications Commission's Further Notice of Proposed Rule Making ("FNPRM") in the above-captioned dockets. WINForum is an alliance of radio manufacturers that are working together to obtain and effectively employ unlicensed spectrum for user-provided voice and data services. WINForum's membership includes, among others, manufacturers of unlicensed devices operating under Part 15 in the UPCS spectrum band.

WINForum has been the principal advocate for the unlicensed personal communications service ("UPCS") band through its active participation in FCC proceedings related to the operation of unlicensed devices. WINForum, in fact, was the principal industry advocate for UPCS in the original FCC proceedings on the 1850-1990 MHz allocations. WINForum's WINTech committee was instrumental in developing the spectral "etiquette" for the UPCS allocation, which is now Subpart D of Part 15. WINForum's WINTest committee, in cooperation with the Commission's Office of Engineering and Technology ("OET") and committee C63 of the American National Standards Institute ("ANSI"), developed detailed measurement procedures that were ultimately adopted by ANSI as an American National Standard for verifying compliance of UPCS devices with Subpart D. WINForum also filed the Petition for Rule Making, referenced in this FNPRM, proposing that the 1910-1920 MHz band be made available for cross-over use by isochronous devices ("Cross-Over Petition").[1]

The Commission's FNPRM seeks comment on the reallocation of certain frequencies for the deployment of advanced wireless services, including the 1910-1920 MHz and 1920-1930 MHz frequency bands. These frequency bands currently are allocated to UPCS use. As discussed below, the FCC should not reallocate the UPCS frequencies for 3G or other relocated services. The UPCS frequency bands are critical to domestic spectrum needs of UPCS users. Reallocation of these frequencies also would undermine the legitimate expectations of UPCS manufacturers, distributors and end users. These groups have invested substantial effort and resources in developing and deploying UPCS devices and clearing microwave users from the UPCS spectrum, in good faith reliance on the Commission's expressed policies and requirements. Reallocation of the UPCS band would prevent these parties from realizing their

[1] Wireless Information Networks Forum ("WINForum") Petition for Rulemaking Concerning the Unlicensed Personal Communications Service, RM-9498, Jan. 8, 1999.

legitimate expectations, damaging the UPCS marketplace. Moreover, the 1910-1930 MHz frequency band is unsuitable for advanced services or relocation use. Use of the UPCS band for 3G does not accord with international consensus on 3G spectrum allocations, especially considering the existing U.S. licensed PCS allocation scheme. Reallocation of the UPCS band for 3G or relocation use would cause harmful interference with UPCS devices. This interference would render UPCS devices unusable, due to the listen-before-talk etiquette for UPCS devices.

Further, the existing use of 1910-1920 MHz and 1920-1930 MHz bands for very low power UPCS devices provides a necessary guard band that enhances the ability of licensed PCS operators to maximize efficient use of adjacent allocations. Thus, use of that spectrum for 3G or other relocated services would not only cause harmful interference to any co-channel UPCS devices, it would also eliminate the guard band, potentially resulting in substantial interference and causing severe dislocation of licensed PCS customers. Instead, the Commission should separate the rulemaking decisions relevant to the 1910-1930 MHz band from larger 3G spectrum decisions and act affirmatively and quickly on WINForum's petition to make the 1910-1920 MHz band available for isochronous devices. This will provide the flexibility needed for isochronous devices to provide new services, expand their user base, and offer needed communications solutions to the U.S. public.

I. ANY REALLOCATION OF THE UPCS BAND WOULD UNDERMINE THE LEGITIMATE EXPECTATIONS OF MANUFACTURERS AND THE PUBLIC, AND JEOPARDIZE THE FUTURE OF THE UPCS INDUSTRY

Manufacturers and users have invested time and resources in UPCS in the justified expectation of reaping the efficiencies and advantages of communications using UPCS devices and the benefits of the UPCS marketplace. These efforts have led to the substantial clearing of the UPCS band of incumbent microwave licensees, and the development of technologies critical to the telecommunications infrastructure. If UPCS frequencies were reallocated, the services

currently provided by UPCS devices would be interrupted or discontinued. The displacement of UPCS devices would not only constitute a breach of the FCC's implicit agreement with UPCS manufacturers, but could be viewed by UPCS end users as a breach of trust on the part of manufacturers. Indeed, the possibility of such reallocation raised by the FNPRM has already caused marketplace uncertainty, resulting in disruption of sales. Thus, reallocation of the UPCS band could cause irreparable harm to the UPCS marketplace.

A. UPCS Manufacturers Have Expended Considerable Resources To Develop the UPCS Band.

Manufacturers have expended substantial effort and financial resources in the UPCS marketplace with the expectation that the 1910-1920 MHz and 1920-1930 MHz bands would remain available for UPCS devices. As an initial matter, manufacturers have made huge financial investments to develop the UPCS market. Manufacturers spent hundreds of millions of dollars to develop products meeting the Commission's stringent UPCS technical requirements. Manufacturers also provided $6 million in initial funding to UTAM, the entity designated by the FCC to clear microwave incumbents from the UPCS band. In addition, UTAM assesses a $20 clearing fee to a manufacturer for each UPCS device sold to defray the costs of clearing incumbent microwave operators from the UPCS bands. Collectively, the industry has spent or committed $60 million in clearing efforts to date. The UPCS marketplace is still in a relatively early stage of development, and thus manufacturers have not had an opportunity to recover their investment. These expenditures in the promotion of a mere 20 MHz of UPCS spectrum constitute a substantial portion of the research and development budgets of many WINForum participants, which are small companies or have single product lines.

Manufacturers' development of UPCS devices required not only substantial financial investment, but also tackling the challenges of FCC rules and procedures. The presence of

incumbent microwave licensees posed difficulties beyond the need to clear the UPCS bands. To address interference to fixed microwave operations during the transition, the Commission requires manufacturers to coordinate with UTAM before any UPCS device is deployed or relocated. The FCC also requires manufacturers to label unlicensed PCS equipment indicating that any relocation of those devices must be coordinated through UTAM. A UPCS device must be automatically disabled if it is relocated outside its intended geographic area, other than by licensed technicians with UTAM approval. These measures impose substantial burdens on manufacturers' development and deployment of UPCS systems compared to systems in other spectrum bands.

B. Reallocation of the UPCS Band Would Prevent Users From Realizing Their Legitimate Expectations and Could Be Disastrous for the UPCS Industry.

Beyond the financial consequences of reallocation of the UPCS band, the implementation of such an action risks substantially undermining the UPCS industry. UPCS end users have made substantial contributions to the development of the UPCS market. Despite the cost of compliance and challenges in marketing UPCS devices, hundreds of thousands of end users have spent millions of dollars on UPCS products. Users made these investments based on the expectation of continued use of UPCS services for mission-critical applications.

The UPCS band is unique among unlicensed spectrum, in that it offers end users reasonable assurances that communications will be free from interference. The Part 15 etiquette, developed by WINForum, allows UPCS devices to operate free from interference. The isochronous etiquette offers interference-free transmission of digital packets over time intervals adequate to provide voice service. Interference limits are necessary because of the "dynamic channel selection" protocol used by isochronous systems to select a clear channel for the

communication link. The UPCS band is thus well situated to meet the needs of mission-critical applications.

Businesses, hospitals, government agencies, public utilities and law enforcement have expended vast amounts of capital in the expectation of continued use of these UPCS devices that form a critical part of their operations. Reallocation of the UPCS band would necessitate manufacturers informing their customers of their need to replace their UPCS systems for communications services. This would require substantial disruption of these users' organizational communications systems, which in many cases are provided in large part through highly-integrated UPCS devices. Further, the undepreciated cost of most current UPCS systems is very near the retail cost of those systems. Many of the licensed microwave users that previously occupied this spectrum used systems that had been almost fully depreciated. In contrast, UPCS end users typically have new equipment, with many systems fewer than two years old. Forcing these burdens on the UPCS market would seriously damage manufacturers' relationships with current customers, and would discourage new customers from adopting UPCS technologies. Indeed, the marketplace uncertainty caused by the possibility of reallocation raised by the FNPRM is already hindering the market for UPCS devices, causing hardship for UPCS device manufacturers.

The FCC must also recognize that the replacement effort and cost to reallocate UPCS devices extends far beyond mere substitution of new wireless products. For example, UPCS wireless connectivity is generally offered as a mobility solution for users seeking to replace old PBX or virtual PBX systems. The ability of manufacturers to offer a mobility adjunct to PBX systems, thus, is a necessary component of any RFP or sale of a new system. The obvious direct result of this is that where users have implemented new PBX systems using UPCS, the entire

system will require replacement—not just the UPCS-specific elements of the system—because many manufacturers offer only one mobility technology for their end user product lines. The less obvious, but equally important aspect of UPCS as a mobility adjunct is that those users who have purchased new PBX systems compatible with UPCS upgrades with the view to a future migration to wireless will be unable to do so. Thus, these users too may have to engage in expensive, disruptive, and resource-intensive replacement of equipment—which they can ill-afford—to maintain their current wireless migration strategies.

Even if the Commission granted current UPCS end users the right to continued use of the UPCS band following its reallocation for advanced services, these users would then face the possibility of interference. Due to the listen-before-talk spectrum etiquette, this interference would leave UPCS devices unusuable. This would eliminate one of the most important characteristics of UPCS devices that made them desirable for critical communications services. Thus, UPCS users would still be forced to completely replace their UPCS systems. In either case, undermining users' reasonable expectations would negatively impact the UPCS marketplace.

II. THE ENTIRE UNLICENSED PCS BANDS ARE NECESSARY FOR MEETING DOMESTIC SPECTRUM NEEDS

UPCS devices already provide a broad range of mission-critical services to end users. Moreover, manufacturers are poised to provide new products to an expanded base of users through the deployment of nomadic devices and through the expanded opportunities available upon release of the entire 20 MHz UPCS band for isochronous systems. The substantial investment and efforts of manufacturers, distributors, and the public allowed the industry to develop to its current state. These efforts include both the development and deployment of technologies compliant with Part 15 etiquette requirements, and the investment of funds to clear

microwave users from the UPCS band. Manufacturers' efforts—and customers' investments in equipment—were undertaken in reliance on the FCC's express policies and requirements. Retaining continued availability of the 1910-1920 MHz and 1920-1930 MHz bands for UPCS is the just response to these efforts.

Although UPCS devices have been a success, they have realized only a portion of their full potential. Currently, end users rely on UPCS devices—particularly isochronous devices—for a wide variety of important services. Isochronous devices allow communications within hospitals, warehouses, power plants and other facilities. Numerous organizations use isochronous devices as wireless PBX systems. These are but a few examples of how UPCS products already improve productivity and make communications more efficient. At the same time, the ability to deploy nomadic devices enabled through the clearing of the remaining incumbent microwave licensees will open UPCS to new uses and greater potential markets.

In addition, for UPCS to realize its full marketplace potential, the entire 1910-1930 MHz band should be available for isochronous devices. The study filed by WINForum with its Cross-Over Petition provides a detailed technical analysis of the spectrum requirements and cell capacity for isochronous systems.[2] The study demonstrates that the additional 10 MHz of spectrum available from cross-over use of the 1910-1920 MHz band would confer substantial long-term benefits, particularly in high-density areas such as multi-tenant high-rises and industrial parks. The additional spectrum would allow UPCS devices to utilize base stations and switching circuits more effectively. This means that cell capacity would no longer be limited by interference, but only by the architecture of the system itself. The additional spectrum also would facilitate the coexistence of different UPCS air interfaces in high-density environments.

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[2] Jay Padgett, *Spectrum Requirements and Cell Capacity for Isochronous UPCS Systems*, Cross-Over Petition, Attachment 2.

Indeed, the FCC itself recognized the need to allocate additional spectrum for the long-term needs of UPCS.[3] Thus, the Commission should not use the 1910-1920 MHz band for 3G or as relocation spectrum in support of 3G. Rather, the Commission should permit cross-over use of the 1910-1920 MHz band by isochronous devices, as discussed in Section IV below.

III. THE UNLICENSED PCS BANDS ARE UNSUITABLE FOR REALLOCATION TO ADVANCED SERVICES OR RELOCATION USE

WINForum submits that the 1910-1920 MHz and 1920-1930 MHz bands are not appropriate either for reallocation to 3G services or for use by licensees and users displaced to accommodate 3G systems. As an initial matter, the use of the 1910-1930 MHz for 3G services is not consistent with international consensus on use of the band. Although the World Administrative Radio Conference identified the 1885-2025 MHz band for possible 3G use, "such use does not preclude the use of these bands by other services to which these bands are allocated."[4] Moreover, any radical restructuring of the 1850-1990 MHz band generally appears beyond the scope of the FNPRM.

Even more significantly, reallocation of the 1910-1930 MHz band to 3G services or for relocation of services displaced in support of 3G would eliminate a necessary guard band protecting licensed PCS operators. Even if the spectrum could be somehow paired for 3G mobile operations, the result would be to create a direct adjacency between a base transmit band and a mobile transmit band. During the PCS allocation process, the UPCS band was allocated, in part, to create necessary separation to prevent adjacent channel interference from higher power base stations from overwhelming much lower power mobile handsets. There is no basis for

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[3] Amendment of the Commission's Rules to Establish New Personal Communications Services, *Memorandum Opinion and Order*, 9 FCC Rcd 4957 at ¶ 207 (1994) ("1994 Order") (stating that "in the near future we will initiate a proceeding to consider allocation of new spectrum to meet the long term spectrum requirements for unlicensed PCS devices.").

[4] *Final Acts of the World Administrative Radio Conference (WARC-'92),* RR S5.388.

believing that base/mobile 3G systems or services relocated in support of 3G would behave in a different manner. Indeed, the mandated use of listen-before-talk makes UPCS systems particularly prone to harmful interference in the sense that operation is completely disabled in the presence of interfering signals.

Moreover, the use of the UPCS bands for accommodating users displaced by reallocation of other bands to 3G services is also untenable. Although it is difficult to analyze the potential interference effects to licensed operations of unspecified adjacent channel operators, it is patently clear that any operation analogous to microwave radio would create a significant likelihood of interference. The Commission has recognized the potential for interference between PCS and incumbent microwave operators, and among adjacent PCS channel blocks, by adopting coordination procedures and interference standards.[5] Thus, deploying any systems comparable to microwave point-to-point links would be infeasible in the band.

These factors indicate that the UPCS band is unsuitable for reallocation for 3G or even for relocation to other services displaced by 3G operators. Use of the 1910-1930 MHz spectrum for 3G has the potential to conflict with worldwide spectrum licensing, given the lack of international consensus on the use of that band for 3G. Further, the Commission should be wary of eliminating the critical UPCS guard band, in light of the very significant potential for interference to licensed operators.

IV. THE COMMISSION SHOULD ACT AFFIRMATIVELY ON THE WINFORUM CROSS-OVER PETITION TO PROMOTE UPCS AS PART OF A SEPARATE PROCEEDING ON 1910-1930 MHZ SPECTRUM ISSUES

Rather than reallocating the UPCS band, the FCC should act to ensure that unlicensed PCS services have the opportunity to reach their full potential. Resolution of this proceeding

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5 1994 Order at ¶¶ 175-201.

could take a substantial amount of time. To expeditiously address the need for additional spectrum for isochronous devices, the Commission should address the Cross-Over Petition in a separate proceeding.

A. The FCC Should Support Cross-Over Use of the 1910-1920 MHz Spectrum By Isochronous Devices.

As discussed previously, the UPCS allocation has been tremendously successful, and continues to promise valuable advanced telecommunications options. Given additional bandwidth, manufacturers will be able to offer new services and serve a broader range of users. Consequently, WINForum submitted its Cross-Over Petition seeking to expand access to the 1910-1920 MHz band to isochronous devices. In its FNPRM, the Commission seeks comment on WINForum's Cross-Over Petition. WINForum reaffirms its support for cross-over use of the asynchronous band by isochronous devices. This additional 10 MHz would allow isochronous devices to more efficiently deliver communications services to a broader range of users.

In 1994 the Commission allocated 20 MHz of spectrum for UPCS. The FCC allocated the 1910-1920 MHz band for "asynchronous" packet data devices. The 1920-1930 MHz band was set aside for "isochronous" devices, which involve regular, periodic transmissions typical of circuit-switched voice service. In the *1994 Order*, the Commission stated that "in the near future we will initiate a proceeding to consider allocation of new spectrum to meet long term spectrum requirements for unlicensed PCS devices."[6] The FCC subsequently allocated an additional 10 MHz for asynchronous devices, and a substantial amount of spectrum at 5 GHz for wireless Local Area Networks,[7] but has not provided additional spectrum for isochronous systems.

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6 *Id.* at ¶ 207.

7 As WINForum noted in its petition recommending the allocation of 5 GHz spectrum for wireless LANs, the allocation would only serve a portion of the anticipated needs for unlicensed devices. *See Petition for Rulemaking*

The limited amount of bandwidth available for isochronous devices is restricting the growth of UPCS products. The current 10 MHz allocation already has reached its saturation point with respect to certain high-density, site-specific services. As discussed in Section II above, the additional 10 MHz of spectrum would confer significant benefits on UPCS end users, particularly in high-density facilities. The immediate utilization of the full 20 MHz would require only minor modifications to existing isochronous UPCS devices and the isochronous etiquette.

The demand for asynchronous devices is evidenced by the numerous devices operating in the 2.4 GHz band and in the Unlicensed National Information Infrastructure spectrum. This shows that the UPCS bands are less attractive for asynchronous devices. The larger bandwidth and/or higher transmit power limits available in other bands partially explain the difference in deployment. In addition, asynchronous UPCS devices are constrained by the asynchronous etiquette and the UTAM coordination process.

Although 1910-1920 MHz band is undesirable for asynchronous devices, it is critical to the continued growth of isochronous devices, which have already seen substantial deployment in the UPCS band. Permitting isochronous devices cross-over use of the 1910-1920 MHz band would promote greater spectrum efficiency and utilization, facilitate development of larger scale customer applications, and alleviate any limits on UPCS deployment in high-density areas. The Commission should adopt the recommendations in WINForum's Cross-Over Petition, providing flexibility to deploy isochronous devices in the 1910-1920 MHz band.

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to Allocate the 5.1-5.35 GHz Band and Adopt Service Rules for a Shared Unlicensed Personal Radio Network, RM-8648, ET Docket No. 96-102, 13-15 and Appendix A (filed May 15, 1995).

B. The Commission Should Address the Possible Reallocation of the UPCS Band and the Issues in the Cross-Over Petition Through a Separate Rule Making Proceeding.

The unique factors associated with the UPCS spectrum warrant the use of a separate rule making proceeding to address UPCS issues. A separate proceeding would allow the Commission to expeditiously address UPCS, without waiting for the lengthy resolution of the FNPRM. Thus, the Commission should separate out the isochronous band issues, and resolve them in a separate making proceeding.

As discussed above, UPCS devices—isochronous devices in particular—are used for critical communications services by hundreds of thousands of businesses and organizations. As discussed above, manufacturers and the public have expended considerable resources in support of UPSC deployment. These UPCS devices now provide a wide variety of communications services. 3G reallocation or relocation use of the UPCS spectrum would displace these end users relying on UPCS devices for mission-critical communications.

Indeed, the Commission's FNRPM already has created a fear among current and potential UPCS end users that this band may be reallocated, resulting in disruption and displacement. Obviously, this could cause undermine the substantial efforts of UPCS manufacturers and end users which have developed a significant UPCS industry. The marketplace uncertainty threatens to discourage potential UPCS users from investing the substantial capital necessary to deploy UPCS devices. The possibility of a depressed UPCS market will, in turn, lead vendors and manufacturers to decrease their investment and development of new UPCS systems. Decreased sales of UPCS devices will also result in fewer funds for use in relocating microwave licensees.

Reallocation or relocation of the UPCS band through this proceeding could have a dire impact on the UPCS industry. It would undermine an industry that, through the efforts of

manufactures and the public, currently provides critical communications services and is poised for future growth with the availability of additional spectrum. To avoid these consequences, the FCC should rapidly address the UPCS issues to prevent further market confusion, which could substantially undermine the UPCS industry.

V. CONCLUSION

The foregoing demonstrates the need to retain the 1910-1930 MHz spectrum for UPCS. A wide variety of wireless end users already rely on UPCS bands, with the industry on the brink of further development. Substantial investments in UPCS, made in reasonable reliance on the FCC's expressed intentions and requirements, compel the preservation of the existing UPCS spectrum. In addition, allocation of the UPCS spectrum for 3G services does not accord with international consensus for 3G-licensed service. The reallocation of the 1910-1930 MHz band for 3G services or to relocate other services would impede the spectrum's valuable role as a guard band preventing interference. Thus, the UPCS band is unsuitable for 3G reallocation or relocation of other wireless services. Instead, the FCC should further promote the efficient and full use of the UPCS band by permitting the cross-over use of the 1910-1920 MHz spectrum by isochronous devices.

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